Jan. 19, 1954 A. KAUFMAN ET AL 2,666,235

WINDOW CONSTRUCTION

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Fig. 1.

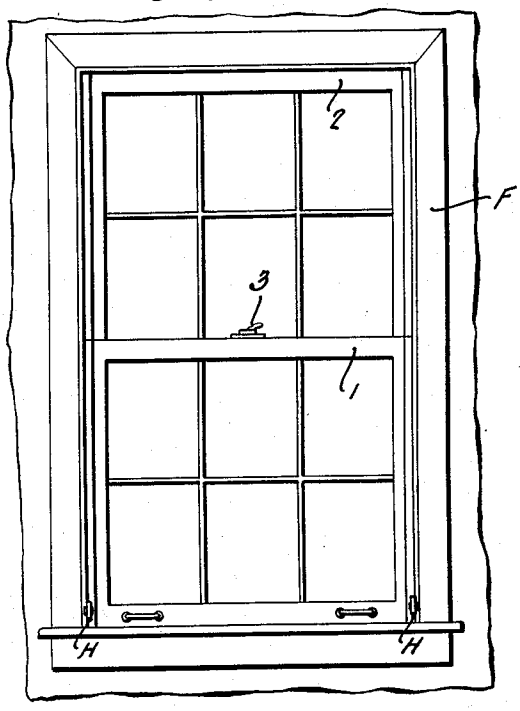


Fig. 2.

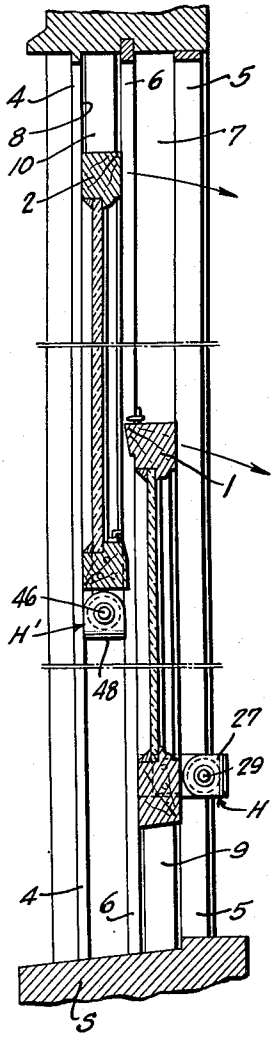
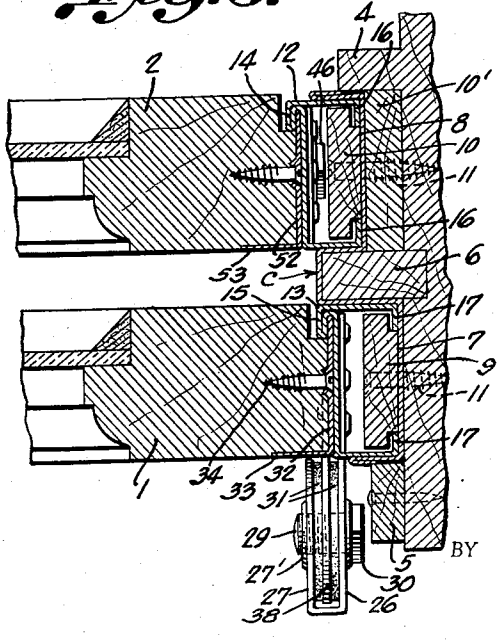


Fig. 3.



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Fig. 4.

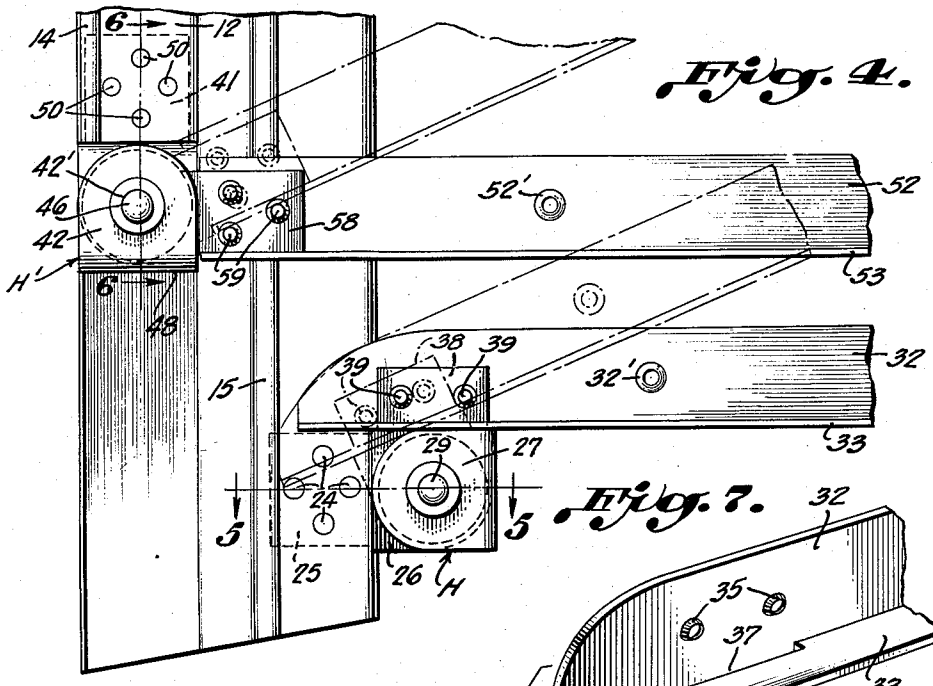


Fig. 5.

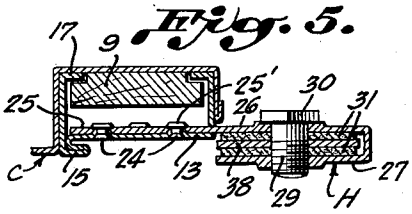


Fig. 6.

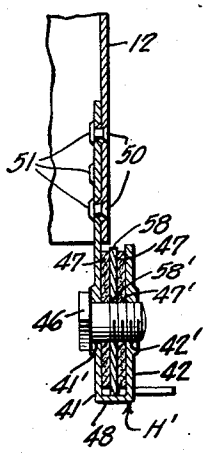
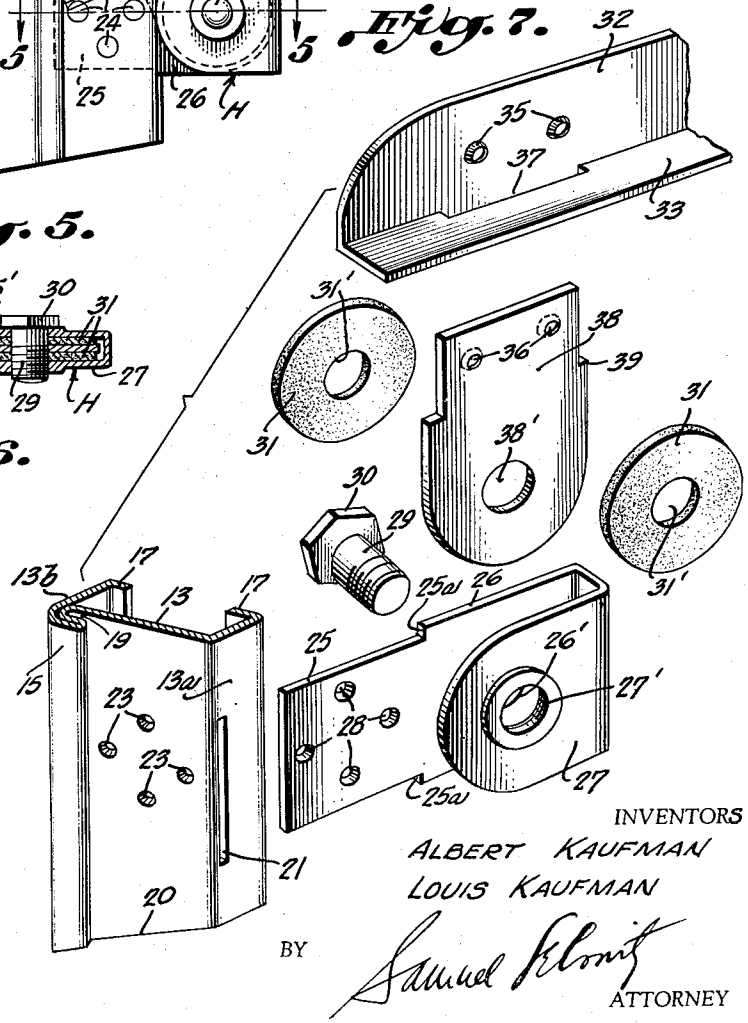


Fig. 7.



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WINDOW CONSTRUCTION

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5 Claims. (Cl. 20—49)

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This invention relates to a window construction having slidable and horizontally swingable window sashes to permit convenient ventilation and cleaning of the window panes entirely from the interior of the building in which the window constructions are installed.

It is the object of the present invention to provide a window construction embodying one or more slidable and swingable window sashes which is characterized by a high degree of ruggedness and simplicity as well as economy in cost.

It is a further object of the invention to provide a window construction embodying slidable and horizontally swingable window sashes which are fitted with pivotal joints or hinges for the latter, which hinges are fully exposed and unobtrusive in appearance, and which permit adjustments of the pivotal joints to be made quickly and easily to attain whatever frictional resistance may be required in the joints in dependence upon the weights of the window sashes, the air currents operating thereon, or other variable factors.

It is a further object of the invention to provide pivotal joints for slidable window sashes composed of relatively few parts of simple hardware which may be stamped from sheet metal and fiber, and processed at a low cost preliminary to their assembly in the window construction. The pivotal joint in addition provides a limit stop for the window sash so that it may not turn more than 90° from its vertical position when the same is rotated for either purposes of ventilation or cleaning.

Other objects and purposes will appear from the detailed description of the invention following hereinafter, taken in conjunction with the accompanying drawings, wherein:

Fig. 1 is a front elevation of the window construction in accordance with the invention,

Fig. 2 is a vertical sectional view along the median line of the window construction showing the upper window sash in partly lowered position and the lower window sash in partly raised position,

Fig. 3 is a horizontal sectional view of the right stile of the window shown in Fig. 1, on an enlarged scale,

Fig. 4 is a left end view of the right stile of the window shown in Fig. 1 with only the hardware parts being shown, in the interest of clarity,

Fig. 5 is a horizontal sectional view along line 5—5 of Fig. 4,

Fig. 6 is a vertical sectional view along line 6—6 of Fig. 4, and

Fig. 7 is an exploded perspective view showing

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the component parts of the pivotal joint on the lower right side of the lower window sash.

In the drawings, is shown a window frame F which may be of wood or metal construction in which is disposed a lower sash 1 and upper sash 2 and which may be provided with the conventional companion members of a locking device 3 on the meeting rails of the two window sashes. The sashes 1 and 2 may likewise be of wood or metal and may have multiple panes or a single pane. Guideways are provided in the opposite stiles of the window frame for the purpose of facilitating the vertical reciprocating movements of the window sashes 1 and 2, and these guideways are defined by outer retaining strips 4, inner retaining strips 5 and intermediate parting strips 6. The construction on each side of the window is congruous with respect to the opposite side and therefore the arrangement on only one side will be described in the interest of simplicity.

In addition to the vertical movements of the sashes 1 and 2 in the guideways provided in the opposite stiles of the window frame, the sashes are capable of pivotal or swingable movements inwardly about horizontal axes, in order to permit the cleaning of both faces of the window panes in the sashes from the interior of the building in which the window constructions are installed. In addition, the controlled tilting of both the upper and lower window sashes enables a convenient control of the ventilating effects upon the interior of the room. Therefore, pivotal joints H at the opposite bottom ends of the lower sash 1 and pivotal joints H' at the opposite bottom ends of sash 2 enable the swinging of the sashes in a clockwise direction as indicated by the arrows in Fig. 2.

Window constructions of the type generally described above and shown in the drawings have been known for many years and such constructions are exemplified by the structure shown in the U. S. Patent to Wight et al., No. 1,658,317, February 7, 1928. The instant invention seeks to simplify such structural assemblies known heretofore.

On each side of the window, the guideway 8 for the upper window sash, between the strips 4 and 6, as well as the guideway 7 for the lower window sash, between the strips 5 and 6, are sheathed or lined with an integral sheet metal member C which also bridges the parting strip 6. This sheet metal member C is maintained within the guideways of the stile by a block 9 of limited length in guideway 7 and by a similar block 10 in guideway 8, through which extend fastening screws 11 in order to clamp the chan-

nel C into the guideways of the window stile. In view of the fact that channel C is of greater depth for guideway 7 than for guideway 8, for the reason that the lower window sash 1 is wider than the upper window sash, a backing strip 10' is provided in guideway 8 between the exterior of the channel and the stile wall in order to compensate for the variation in depth of the two guideways in channel C.

A sheet metal slide 12 extending substantially for the full length of the upper window sash is adapted to be sprung into each guideway 8 and is formed with a re-entrant flange 14 at its exposed part as well as with terminal flanges 16 at its concealed portion which engage behind slots in the fastening block 10 to positively retain the metal slide 12 within the guideway 8 as the same executes its vertical reciprocating movements. The flange 14 is provided for the purpose of affording a weather stripping joint with the metal edging 52 affixed to the side of the window sash 2 when the window sash is coincident with the slide 12 for reciprocal up-and-down movement. The edging 52 joins with a front flange 53 at the front of the window sash.

Similarly a slide 13 for the lower window sash is formed by sheet metal channel having the weather stripping flange 15 at its exposed portion and retaining flanges 17 at its concealed portion for engagement behind slots formed in the fastening strip 9 provided in the guideway 7. The perspective view of slide 13 in Fig. 7 clearly illustrates the formation of both slides 12 and 13 which extend substantially for the height of each window sash on the opposite sides thereof and which normally travel therewith in the course of raising and lowering each window sash to any desired extent as indicated in Fig. 2.

The window in accordance with the instant invention presents a simplified construction by virtue of the elimination of any need for sash weights for counterbalancing purposes, since the resiliency of the sliding channels 12 and 13 and particularly the frictional force arising from the pressure of the front and rear walls 13*a* and 13*b* against the adjacent walls of the metal lined guideways 7 and 8 effects a frictional hold of each window sash within its guideways so that they remain in any set position, without the need for any counterbalancing weights or springs.

The lower window sash is provided on its opposite vertical sides with a rectangular edging having front portion 33 extending along the front of the window and a lateral portion 32 extending along the edge of the window sash for its entire extent, and this edging is maintained in integrated condition with the window sash by means of fastening screws 34 extending through stamped openings 32' at displaced points along the lateral wall 32 of the metal edging. It is desirable that the lateral wall of the sheet metal edge 32 of the window sash and the contacting face of the slide 13 adjacent thereto be maintained in closely fitting engagement in order to exclude the entry of air currents into the interior of the building. This weather-sealing function is assisted by the weather-stripping flange 15 which forms the groove 19 at the end of the face 13 of the slide, which groove accommodates therein the terminal edge of the lateral strip 32 as shown in Fig. 3. At the same time, the window sash may be swung forwardly of the flange 15 when it is desired to do so as clearly shown in Fig. 4, for the full extent of 90° shown in full lines and in an intermediate position as indicated by dotted lines. A simple exposed hinge joint is provided at each side in order to permit the pivotal movement of the window sash relative to the slide members 13, and is composed of relatively few parts of strap metal of about $\frac{1}{16}$'' thickness, all of which are illustrated in Fig. 7.

Since it is essential that the contacting surfaces between the sheet metal slide 13 and the sheet metal edging 32 on the lateral wall of the window sash be perfectly smooth, the pivotal joint between these two parts includes a J-shaped sheet metal lug having a long arm with component parts 25 and 26. The terminal portion 25 of the lug extends through a slot 21 in the front wall of the channel 13 so that the edge of the J-shaped member may come to rest against the rear wall 13*b* of the channel member 13. The slot 21 is formed near the lower end of the slide, the bottom edge of which is sloped to correspond to the inclination of the sill S of the window. If desired, shoulders 25*a* are defined at the break between the parts 25 and 26 so that these may come to rest against the forward wall of the slide, above and below the slot 21 to limit the inward movement of the lug. The short arm of the J-shaped lug 27 is short enough to clear the front wall of the slide 13 so that the same does not interfere with the insertion of the lug into the interior of the slide 13.

A plurality of openings 23 are punched in the slide in alignment with openings 23 in the part 25 of the lug, and both sets of openings are countersunk to receive rivets 24 with flat heads which are upset on the opposite ends at 25' on the inside of the slide remote from the exposed contacting face thereof, so that the lug and the slide are maintained in rigid relationship without affecting the smooth character of the exposed face of the slide 13.

Similarly, a plane sheet metal lug 38 which may be provided with offset shoulders 39 is adapted to be integrated with the sheet metal edging 32 by passing the lug 38 through opening 37 in the front portion 33 and by punching openings 35 in the lateral wall 32 with aligned openings 36 in the plate 38 for the purpose of receiving rivets 39. The flat-headed rivets 39 are upset at the end of the plate adjacent to the window frame so that the protuberances may accommodate themselves in the metal or wood of the window sash without difficulty, leaving the exposed contacting face of the sheet metal edging perfectly smooth in view of the countersunk disposition of the rivets 39 into the correspondingly countersunk punched openings 35 and 36.

Now that the slide 13 is provided with a forwardly extending J-shaped lug and the lower window sash is provided with a plane sheet metal lug extending forwardly therefrom, the latter is mated with the former as shown clearly in the plan view of Fig. 3. Special apertured fiber washers 31 are disposed on the opposite sides of the lug 38 and intermediate the long and short legs of the J-shaped lug 26 and 27 respectively. The plane metal lug 38 is provided with circular opening 38' in alignment with openings 26' in leg 26 and 27' in leg 27, and likewise circular openings 31' are formed in the washers 31, all of which are aligned in order to accommodate a bolt assembly 29 having a shallow head 30 for extension through the several openings for the purpose of maintaining them in a fixed engagement, which may be easily adjusted from time to time. Preferably, the circular openings 26'

and 27' are provided with raised annuli at their outer boundaries and the opening 27' is threaded in order that the nut may engage such threads for the purpose of effecting the fastening without the need for a special nut at its free end. This shortens the pivotal joint and thereby simplifies it to impart a pleasing appearance to the assembly. As shown in Figs. 4 and 7, the top edges of the legs 26 and 27 act as limit stops for the pivotal movement of the sash, limiting such rotation to an angle of 90°.

The washers in accordance with the present invention are formed of special materials in order to impart a desired degree of compressibility thereto without affecting the smooth surfacing thereof so that the pivotal movements may be effected over long periods of time without destroying the tightness of the joint. These washers are known as "natural grade C canvas Lamitex washers" which are fabricated from canvas impregnated and pressed with urea-formaldehyde resins to attain a product of the Formica type. The areas of these washers are substantial in order to attain the necessary frictional forces and are preferably formed of $\frac{1}{16}$'' thickness with an outside diameter of $1\frac{5}{16}$'', having an inside diameter of 0.382'' in order to enable the same to be slipped over a ⅜'' diameter bolt. The ⅜'' diameter bolts may be ⅜'' long with #24 threading at the end, and are provided with a special hexagon head of only ⅛'' depth and the whole of which is cadmium plated.

The construction of the pivotal joint for the upper window sash is similar to the assembly described above with the exception that the J-shaped sheet metal lug extends downwardly from the corresponding slide 12 as shown in Fig. 6, rather than forwardly therefrom. The long arm 41 of the lug is provided with opening 41' and the short arm of the lug 42 is provided with opening 42' for the extension of the bolt 46 therethrough for threading engagement with the threads in opening 42', which is thickened at its outer margin. The plane sheet metal lug 58, having an aperture 58', is affixed to the inner face of the sheet metal edging 52 of the upper window sash by means of a plurality of rivets 59 (Fig. 4). The long arm 41 of the J-shaped lug is fastened to the inner face of the slide 12 by means of rivets 50 which are countersunk in the aligned openings in the slide 12 and in the long arm 41, which rivets are upset at 51 in the remote part of the slide. Washers 47 having apertures 47', similar to washers 31, are disposed on the opposite sides of lug 58 between arms 41 and 42, and the whole assembly is maintained in integrated condition by adjustably tightening the clamping of the lug 58 and washers 47 between arms 41 and 42 by means of bolt 46.

The slide 12 on each side of the window sash may be lowered to a level slightly above the pivots H so that the upper window sash may be rocked forwardly to any desired extent by disengaging the window sash from its corresponding slides 12 in the opposite stiles. In the case of the hinges H', the base 48 of the lug between arms 41 and 42, limits the rotary movement of the sash 2 to 90°.

It is a simple matter to adjust either the bolt-heads 30 of the pivot assemblies H, or the bolt-heads 46 of the pivot asesmblies H' in order to vary the degree of tightness of the pivotal joints, this operation being very simple. In view of the smoothness of the fiber washers, the degree of the tightness of the pivotal joints does not vary despite the repeated rotary movements of the window sashes.

While we have described our invention as embodied in specific forms and as operating in specific manners for purpose of illustration, it should be understood that we do not limit our invention thereto, since various modifications will suggest themselves to those skilled in the art without departing from the spirit of our invention, the scope of which is set forth in the annexed claims.

We claim:

1. In a window construction wherein a window sash is slidable in a frame and swingable inwardly for cleaning and ventilating purposes, a sheet metal slide mounted for reciprocating movement within the frame, a window sash fitted with a sheet metal edging pivotally mounted to said slide at the lower end thereof with the adjacent contacting faces of said sheet metal slide and said sheet metal edging being in close frictional engagement for weather-sealing purposes, and a pivoted joint between said slide and said edging comprising a J-shaped sheet metal lug having its long arm affixed to the face of said slide remote from its contacting face, a cooperating plane sheet metal lug affixed to the face of said edging remote from its contacting face and projecting therefrom into the base of said J-shaped lug, aligned openings in said two lugs, a pair of smooth compressible apertured washers on opposite sides of said plane lug, and a bolt assembly extending through said openings for maintaining said lugs and washers in integrated condition to effect the longitudinal compression of the pivoted joint which remains unaffected by the pivotal movements of said sash relative to said slide.

2. In a window construction wherein a window sash is slidable in a frame and swingable inwardly for cleaning and ventilating purposes, a pair of sheet metal slides mounted for reciprocating movement within the opposite sides of said frame, a window sash of a heighth substantially co-extensive with said slides, fitted with a sheet metal edging pivotally mounted to the opposed slides at the lower ends thereof with the adjacent contacting faces of said sheet metal slides and said sheet metal edgings being in close frictional engagement for weather-sealing purposes, a pivoted joint between each slide and its respective edging comprising a J-shaped sheet metal lug having its long arm riveted to the face of said slide remote from its contacting face by means of rivets having countersunk heads within said last-mentioned face and upset ends adjacent to said long arm, a cooperating plane sheet metal lug riveted to the face of said edging remote from its contacting face and projecting therefrom into the base of said J-shaped lug, by means of rivets having countersunk heads within said last-mentioned face and upset ends adjacent to said window sash, aligned openings in the respective sets of J-shaped and plane lugs, a pair of smooth compressible apertured washers on opposite sides of each plane lug, and a bolt assembly extending through each set of openings for maintaining said lugs and washers in integrated condition to effect the longitudinal compression of the pivoted joint which remains unaffected by the pivotal movements of said sash relative to said slide.

3. A device as set forth in claim 2 wherein the edges of the J-shaped lugs provide stops for the pivotal movements of said plane lugs to limit

the possible relative movement therebetween to approximately 90°.

4. In a window construction wherein a window sash is slidable in a frame and swingable inwardly for cleaning and ventilating purposes, a pair of sheet metal slides mounted for reciprocating movement within the opposite sides of said frame, a window sash fitted with a sheet metal edging on its opposite sides and pivotally mounted to the respective slide at the lower end thereof with the adjacent contacting faces of said sheet metal slide and said sheet metal edging being in close frictional engagement for weather-sealing purposes, a pivoted joint between each slide and its respective edging comprising a J-shaped sheet metal lug having its long arm riveted to the face of said slide remote from its contacting face, a cooperating plane sheet metal lug riveted to the face of said last-mentioned edging remote from its contacting face and projecting therefrom into the base of said J-shaped lug, aligned openings in the respective sets of J-shaped and plane lugs, a pair of smooth compressible apertured washers on opposite sides of each plane lug, and a bolt extending through the opening in one arm of each J-shaped lug and threadedly engaging the aligned opening in the opposite arm of said last-mentioned lug, for maintaining said lugs and washers in integrated condition to effect the longitudinal compression of the opposed pivoted joints without hindering the pivotal movements of said sash relative to said slide.

5. A window construction comprising upper and lower sashes slidable in a frame and swingable inwardly about horizontal axes for cleaning and ventilating purposes, two pairs of sheet metal slides mounted for reciprocating movement within the frame, one pair for carrying the upper sash and the second pair for carrying the lower sash, each window sash being fitted with a sheet metal edging on its opposite sides and pivotally

mounted to the respective slide at the lower end thereof with the adjacent contacting faces of said sheet metal slide and said sheet metal edging being in close frictional engagement for weather-sealing purposes, a pivoted joint between each slide of said upper sash and its respective edging comprising a J-shaped sheet metal lug having its long arm affixed to the face of said slide remote from its contacting face, and extending from the lower end thereof, a cooperating plane sheet metal lug affixed to the face of said last-mentioned edging remote from its contacting face and projecting from the lower end thereof into the base of said J-shaped lug, a pivoted joint between each slide of said lower sash and its respective edging comprising a J-shaped sheet metal lug having its long arm affixed to the face of said slide remote from its contacting face, and extending forwardly of the slide near the lower end thereof, a cooperating plane sheet metal lug affixed to the face of said last-mentioned edging remote from its contacting face and projecting forwardly of the sash near the lower end thereof into the base of said last-mentioned J-shaped lug, aligned openings in the respective sets of J-shaped and plane lugs, a pair of smooth compressible apertured washers on opposite sides of each plane lug, and a bolt extending through the opening in one arm of each J-shaped lug and threadedly engaging the aligned opening in the opposite arm of said last-mentioned lug for maintaining said lugs and washers in integrated condition to effect the longitudinal compression of the pivoted joint without hindering the pivotal movements of said upper and lower sashes relative to said slides.

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No references cited.